U.S. NAVY MEDICINE

July-August 1985

POLICY: *U.S. Navy Medicine* is an official publication of the Navy Medical Department published by the Naval Medical Command. It disseminates to Navy Medical Department personnel official and professional information relative to medicine, dentistry, and the allied health sciences. Opinions expressed are those of the authors and do not necessarily represent the official position of the Department of the Navy, the Naval Medical Command, or any other governmental department or agency. Trade names are used for identification only and do not represent an endorsement by the Department of the Navy or the Naval Medical Command. Although *U.S. Navy Medicine* may cite or extract from directives, official authority for action should be obtained from the cited reference.

DISTRIBUTION: *U.S. Navy Medicine* is distributed to active duty Medical Department personnel via the Standard Navy Distribution List. The following distribution is authorized: one copy for each Medical, Dental, Medical Service, and Nurse Corps officer; one copy for each 10 enlisted Medical Department members. Requests to increase or decrease the number of allotted copies should be forwarded to *U.S. Navy Medicine* via the local command.

U.S. NAVY MEDICINE is published from appropriated funds by authority of Department of the Navy, Naval Medical Command, in accordance with Navy Publications and Printing Regulations P-35. Second class postage paid at Philadelphia, PA, and additional mailing offices. ISSN 0364-6807. Articles, letters, and address changes may be forwarded to the Editor *U.S. Navy Medicine*, Department of the Navy, Naval Medical Command (MEDCOM 00D4), Washington, DC 20372-5120. Telephone (Area Code 202) 653-1237, 653-1297; Autovon 294-1237, 294-1297. Contributions from the field are welcome and will be published as space permits, subject to editing and possible abridgment.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

NAVMED P-5088

POSTMASTER: Send change of address orders to U.S. Naval Publications and Forms Center, ATTN: Code 306, 5801 Tabor Avenue, Philadelphia, PA 19120.

U.S. NAVY MEDICINE

Vol. 76, No. 4
July-August 1985

COVER: The mammoth bow of the hospital ship USNS *Mercy* dwarfs LT Doug Faulls, MSC. Story on page 5. Photo by the Editor

A Mass Casualty Exercise

"An infantry battalion on maneuvers in a hostile environment has been besieged by the enemy. Casualty estimates placed near 100. Airlift planned to your location. Estimated time of arrival is 2 hours."

This gruesome scenario could become a reality for any military hospital overseas. Disaster planning and mass casualty drills are primary means available to test readiness for those situations. The U.S. Naval Hospital (USNH) and the U.S. Naval Dental Clinic (USNDC), Okinawa employed that scenario in initiating a mass casualty drill.

Although the drill was planned to incorporate medical assets from the U.S. Air Force Clinic, Kadena Air Base, the USNH, and USNDC, nature caused a last minute site change. This exercise, a Third Marine Amphibious Force (III MAF) air transportability plan, was to airlift the 100 simulated casualties from the Republic of Korea and touch down at Kadena Air Base, Okinawa. The staging site was to be adjacent to the runway. Medical assets from the Third Medical Battalion, a disaster site team from the USNH, and personnel from the Air Force Clinic were to triage and transport from the location.

A typhoon in Guam diverted B-52 aircraft to Kadena, poor weather in Korea caused a delay in departure of the victims, and the disaster exercise had all the ingredients for a disaster in itself. This temporary crisis further tested the ability to adjust. During an actual crisis, the ability to adjust to meet differing developments would be essential to insure mission requirements. Within 2 hours the site was changed, emergency generators and lighting were in place, and the hospital stood ready to receive the casualties.

The hospital called on the invaluable experience of the senior enlisted community with prior Vietnam exposure. Proper litter handling, triage assessment, and familiarization with the casualty flow proved to be key elements in the drill's success. Combining what they learned in the field and their surgical knowledge, the physicians at the disaster site efficiently moved the casualties into the receiving station.

"Too many victims" was the statement made by several novices. "Wait until the others arrive," said the more experienced veterans. Scorched victims of chemical warfare, mutilated limbs, fractured bones, sucking check wounds, and eviscerated bowels poured into the triage area. The magnitude caused the less experienced to become anxious and fatigued.

Bringing order to the otherwise chaotic triage area, the coordinator calmly and methodically surveyed the victims, insuring that proper identification and category had been determined. Like an orchestra conductor, he motioned for the litter-bearers. The casualties were swiftly dispatched to the appropriate treatment area.

Each assessment and treatment station buzzed as the medical/dental staff responded with appropriate care. Time was taken to educate and expose those less familiar with the complexities of each injury. With the completion of treatment, the responsibility of movement became the area coordinator's focus.

"Bed control, bed control, this is . . . ," was a common radio transmission that night. The Bed Control Officer tracked each patient and quickly responded to movement requests. She carefully monitored the bed status board and her staff dictated the location and proper time for each casualty to be relocated. Time quickly passed and casualty counts increased.

At 2115, 75 minutes after their arrival, the last of the 50 casualties had been taken from the operating room. There was a breather with time to gather thoughts and to resupply.

"Disaster operations reports that 50

Stretcher-bearers await signal from disaster site coordinator.

Patients are assessed and stabilized in treatment area.

additional casualties incoming. ETA 15 minutes." That message ignited phase two—education of the staff in triage measures. All medical personnel gathered at the disaster site for "hands on" triage. Again, the Vietnam veterans familiar with casualty movement and triage provided good experience in assessment procedures and movement direction. The casualty flow from the site to the primary triage area moved like a well-oiled machine. Time was saved, congestion kept to a minimum, and human lives were preserved.

Critiques from exercises of this nature are valuable aids for improvement. Drawing suggestions from all treatment areas, coordinators, and participants, the Disaster Preparedness Committee assembled and quickly recommended alterations. Those problem areas addressed during the critique received immediate attention, if possible, and alternatives were suggested for problems requiring long-term correction. Many participants expressed concern over communication, not only within the hospital, but with the disaster site as well. Resource availability—specifically manpower—was also an important issue raised during the critique. Of immediate concern was the role of dental officers in this exercise. Continuous exposure and education of *all* personnel was the paramount issue.

This mass casualty drill was considered successful. Much of the credit must be given to those responsible for educating the staff. Prior to the exercise the entire staff, divided into smaller groups, learned the physical layout for the plan. Careful attention was given to even the minute details. They discussed purpose, staffing, and how the treatment areas related to each other. This complete exposure provided the adhesive needed to draw everyone into the team effort. No doubt, with additional drills, new perspectives will surface and improvements will be made. □

—Story and photos by ENS Mark J. Bland, MSC, USN, U.S. Naval Hospital, Okinawa, Japan.

Navy Unit Initiates EMT Program

A first of its kind Naval Reserve emergency medical technician program has been in operation for the past 15 months involving the Naval Reserve Unit 613, Naval Hospital Great Lakes, Southfield, MI. The program features 180 hours of training for personnel to become emergency medical technicians (EMT's). This training permits members to challenge for the National Registry and State of Michigan certification as EMT's.

Certified EMT's respond to medical emergencies by providing immediate basic life support at the scene and enroute to and in the hospital. According to CDR Reg Williams, unit commanding officer, the naval reservists worked with civilian paramedics and under the instruction of a doctor-nurse-corpsman coordinating team to develop and implement the training program.

Students learn to immobilize an accident victim's neck and spine.

The program began when some in the unit suggested that it would be valuable training for all members to be trained as EMT's. The administration of the program consisted of acquiring a course coordinator, developing an outline, and testing and evaluating the results. This led to approval by the State of Michigan Department of Public Health to conduct the course, marking the first time a Reserve unit and a state have united to provide reservists the opportunity to become certified EMT's.

The participants spent their 2-week ACDUTRA at their own Reserve center continuing work begun in their normal monthly drill weekends. This included practicing and perfecting the latest techniques in modern emergency care.

LCDR Donald Rhule, coordinating doctor and official EMT instructor, said the participants attended many classes and completed exams in several medical areas. The course covered 26 chapters of basic emergency medical technician training. "We had to do the training in accordance with state rules in order to get everyone certified," Dr. Rhule said. This meant many hours of classroom time in addition to clinical practice which focused on virtually every aspect of treatment from emergency childbirth to cardiopulmonary

Fireman demonstrates the "Jaws of Life."

resuscitation and from splint application to vehicle extrication.

LCDR Katherine Wildern, coordinating nurse, said the program received a valuable boost from outside the military. "Many letters were sent out in preparation of the project, requesting assistance from various people and organizations."

The requests, which were successful, included classroom help as well as supplies. Local schools, police and ambulance agencies, and hospitals provided assistance. "We even got an old car from a local junk yard for practicing our extrication technique," pointed out HM2 Michael Farnstrom, coordinating corpsman. Here the students learned to use a hydraulic apparatus called the "Jaws of Life" to extricate victims trapped inside a demolished vehicle.

LCDR Wildern said testing and evaluation of the participants was an enormous task which advanced corpsmen and nursing personnel undertook. "Much of this was done on personal time. Everyone cooperated and helped make the task easier," she said.

RADM W.D. Daniels, USNR, commended the unit for the program. "This unit stands alone in the Naval Reserve as an example of the best that can be achieved in medical readiness when personnel skills and motivation can be molded into an organized phalanx achieving a common goal."

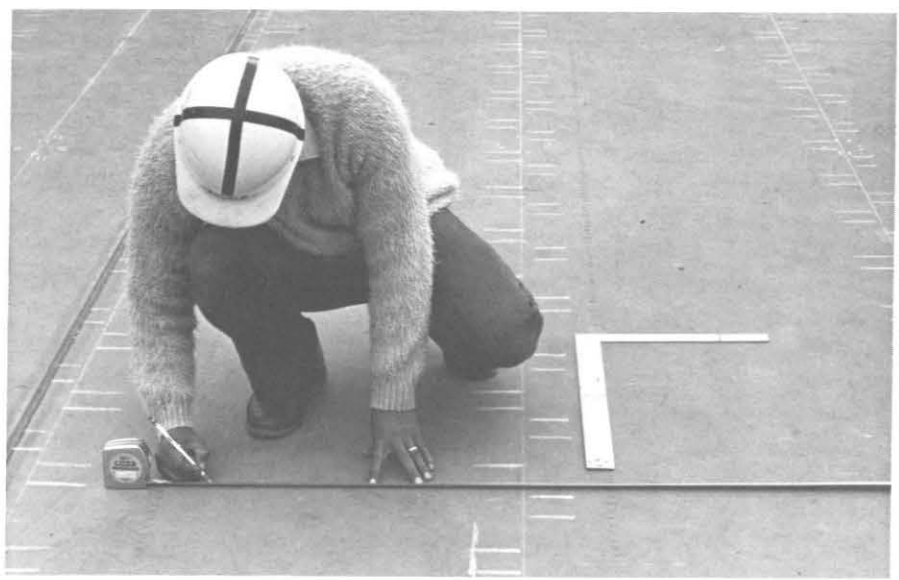
The unit was able to operate the program successfully through community assistance and cooperation with no financial support from the Federal Government. □

—Story and photos by LCDR Ritch K. Eich, Naval Reserve Center, Southfield, MI

Photos by the Editor

SUPSHIP San Diego Quality Assurance Specialist Dennis Frayer (second from left) discusses inspection findings with NASSCO foremen. Hundreds of quality checks are performed on each ship throughout its conversion.

A burner cuts a steel plate. This piece will then be welded to other plates to form a subassembly of a larger module.



A leadman lays out cut and weld marks. Steel plates will be placed on end over the solid white lines and welded, using the "hash marks" as guides for intermittent weld beads.

Hospital Ship: The Next Chapter

*It's an unlikely paint scheme for a supertanker—pure white with crimson red crosses emblazoned on her hull. That may be the first impression many new observers get as they travel along San Diego's Harbor Drive or cross the Coronado Bridge. The gleaming vessel is the centerpiece of the National Steel and Shipbuilding Company's yard and has become the city's most conspicuous new waterfront "landmark." At closer range one can see that this former hauler of crude oil is rapidly becoming something else; it is a hospital ship in the making.**

I passed through the NASSCO gate just as the day shift began. Workers, lunchpails at their sides and hardhats in place, quickly checked into their sections and began the day's assignments. Everywhere, giant giraffe-like cranes crawled along on steel rails. Entire ship's compartments, some weighing over 100 tons, and complete with decks, overheads, and equipment bolted in place, swung from cables.

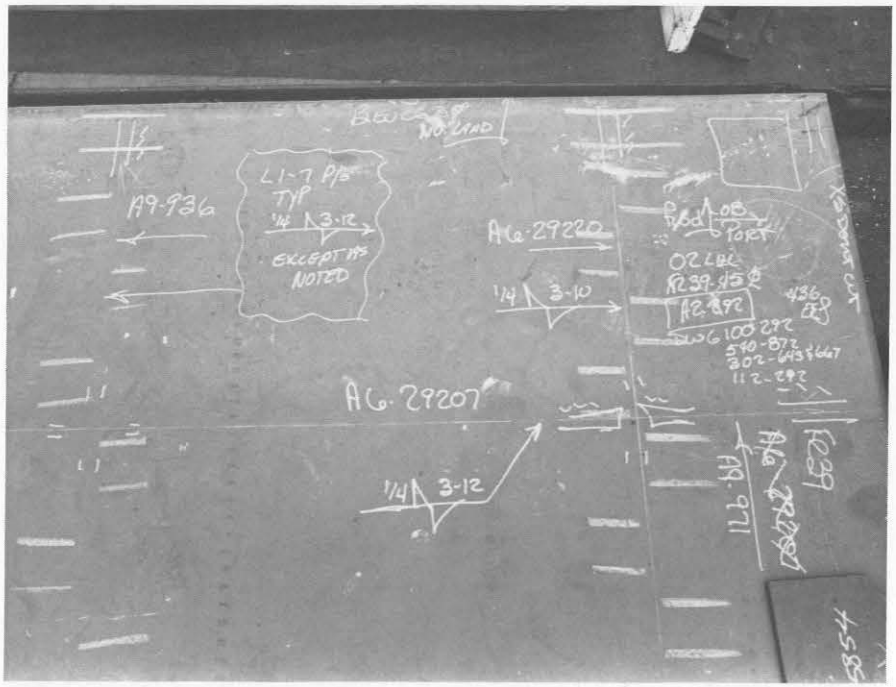
Any illusions that this was a typical American factory evaporated when I confronted the immensity of the operation and the sheer size of the products these workers were producing. Seagoing vessels are not automobiles or refrigerators! Although one could see that other ships were being built or repaired in the 145-acre yard (the west coast's largest), much of the activity seemed to center on one vessel in particular.

The white-hulled tanker, "high and dry" in the graving dock, was impossible to overlook. It may have been the incongruity of the red crosses that fascinated me. Perhaps it was her 894-foot-long bathtub-like hull supported by hundreds of wooden blocks. More likely, it was the knowledge that this was a first; turning a supertanker into a hospital ship had never been done before. Whatever my initial reaction, I noted that at this stage the vessel bore little resemblance to the ship she was to become. USNS *Mercy* still looked like a tanker, even though over 13 miles of piping and 3,200 tons of steel had been removed from her hold.*

*The 9-year-old NASSCO-built tanker ST *Worth* had her entire inside ripped out, leaving only her shell, engine room, and athwartship watertight bulkheads intact. Because of the viscous cargo she once hauled, workers had to "sweet blast" (a high pressure sandblasting method) the entire hold. Inner bottoms were then reinforced and the aft-mounted bridge removed to be reinstalled forward later on.

Welders complete the addition of bilge keels, which run the length of each side of the ship at the turn of the bilges. The keels will provide added stability by reducing ship roll underway.

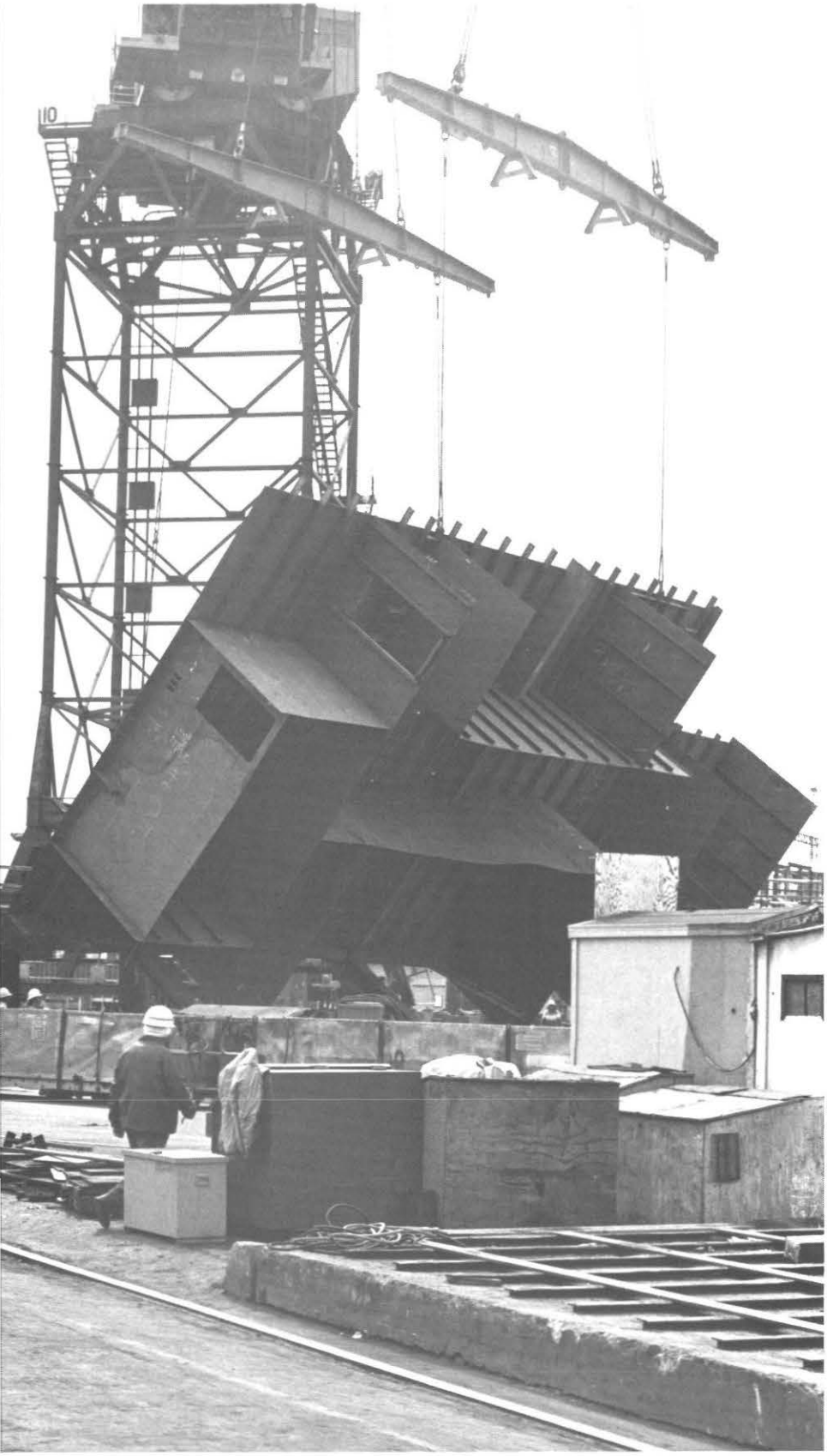
*See "Hospital Ships Are Back," *U.S. Navy Medicine*, January-February 1985.



What appears as a foreign language is the contractor's method of describing welds, cuts, and steel erection placement. The "hash marks" at the left and right indicate welding bead sequences. The "A6" and "A9" numbers refer to subassemblies of a larger unit. "02 LVL, FR 39-45" locates this assembly on the 02 level between frames 39 and 45 near the centerline of the ship, placing this unit in the crew's galley/serving area.

A pipe welder performs last-minute preparations to a unit prior to its erection.

A rigger foreman supervises a typical heavy module lift. Notice the "CPR Qualified" decal on his hardhat.



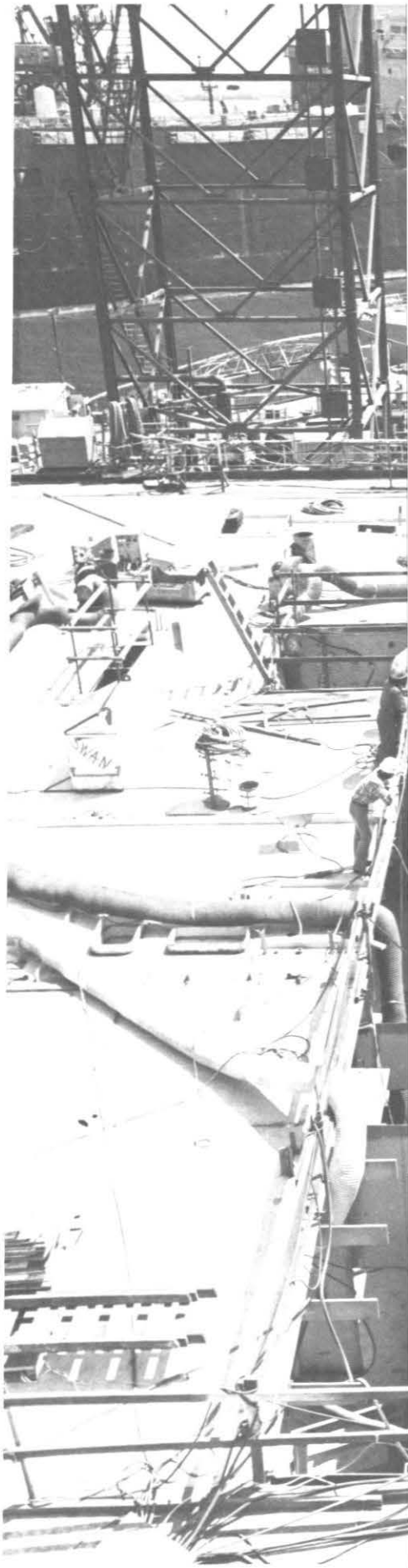
An on-block unit midway through a 90° turn. Rotating each module allows the various trades to work in a "hands down" position. This makes their work less strenuous, much safer, and more efficient.

Much of what had been replaced remained hidden beneath her ample decks. It was alongside the graving dock, in what was called the platen area, where *Mercy* was really being built. Here, welders, pipefitters, and sheet metal workers plied their trades. Burners with acetylene torches cut decking from huge steel plates. Leadmen working from prints then marked the steel for the welders. A stanchion to be welded here, a gusset there. Was this to be a deck or an overhead?

The answer wasn't immediately apparent and, not far away, another component, in a more finished state, compounded my confusion. Ceiling fixtures had been welded to the deck, drains were draining up, pipes deadended, and stairs were leading nowhere. I was obviously ready for my first lesson in the "new technology."

LT Doug Faulls, MSC, attached to SUPSHIP San Diego, for the hospital ship project, was my teacher. Before long, I had mastered the terminology "On Unit," "On Block," "On Board," and learned that NASSCO and other U.S. yards had adopted new methods to survive in a very competitive industry. "We've been forced to import, or I should say reimport, our own technology from the Japanese, who have perfected it over the past 20 years," explained David Gordon, NASSCO's hospital ship program manager. "We developed mass production techniques during World War II to produce ships very rapidly. After the war, American shipbuilding went back to the traditional methods. Each ship was designed from scratch, the parts fabricated and packed inside a hull built deck by deck. That method is no longer competitive." Gordon pointed out that Japanese and South Korean yards build single model vessels using modular, mass production methods, the so-called on unit, on block, on board construction.

A 40-foot flat at the beginning of its trip from the building ways to its location on Mercy. *This unit will rest directly over diesel generators in the auxiliary machinery room. Note the ducting and piping already in place.*



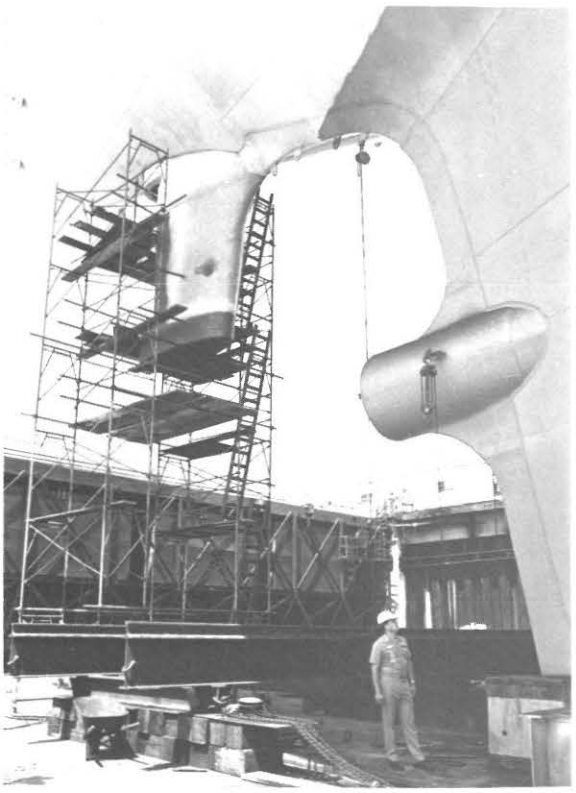
The unit is positioned for lowering into the auxiliary machinery room. The two posts are temporary shoring used to support the module until it is welded in place.

In the *on unit* concept, an entire unit such as a generator room or pump room is fabricated outside the ship. The generators or pumps are mounted on their foundations, complete with piping and valves. When the time comes, the entire unit can be lifted into the hull and welded to the appropriate deck.

In the *on block* concept, several units with foundations are welded to a single deck section off ship. Other units and deck may be welded on top of the first, and then the entire "block" is hoisted into the hull for installation.

On board simply means that the installation takes place within the hull itself.

"In the traditional method, individual rooms were built inside the hull and cable runs, vent ducting, wireways, and piping systems were installed afterward," pointed out LCDR J.R. Cummings of SUPSHIP San Diego, Conversion and Repair.



LT Doug Faulls surveys the stern tube and rudder area.

"The welders and pipefitters are forced to work in tight, uncomfortable positions." In the new technology blocks are constructed upside-down. Welders can work uncramped and outside with adequate ventilation. Moreover, they can employ the "downhand" technique, letting gravity help the weld flow. No more sparks showering down from above. Welding a bracket to an overhead is no longer tiring, inefficient, or dangerous. When the block is completed, it is turned rightside up, hoisted into the hold, welded into position, and painted. Pipes and ductwork are joined and the wiring completed. Using the "blue sky" concept, blocks below the waterline are constructed and installed first, then any associated equipment not installed at the on-block stage is landed on the ship prior to the installation of the deck or block immediately above.

Since the middle of April, when *U.S. Navy Medicine* visited the NASSCO yard, major construction has been completed. So has below the waterline work such as the addition of bilge keels, reinstallation of the shaft and the fitting of a new propeller (see box), installation of requisite through-hull fittings for evaporators and pumps, and priming and painting.

Mercy's "Designer" Propeller

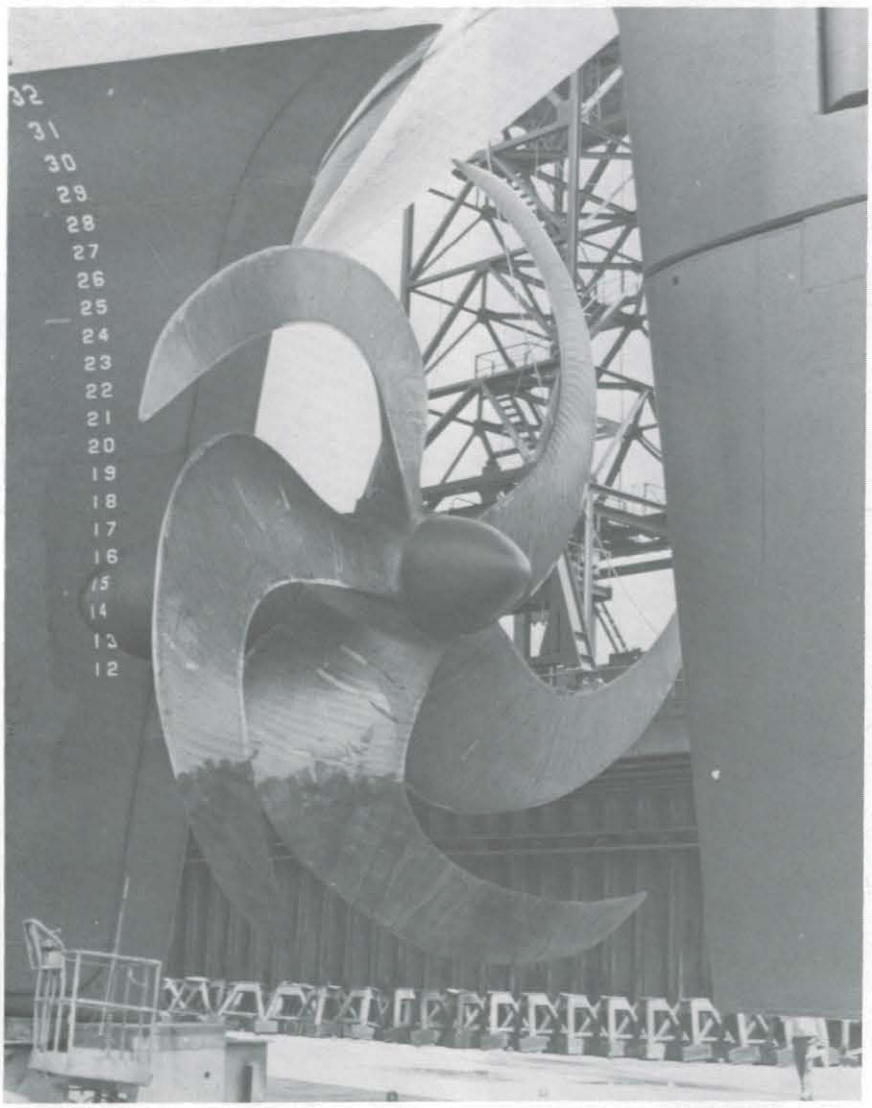
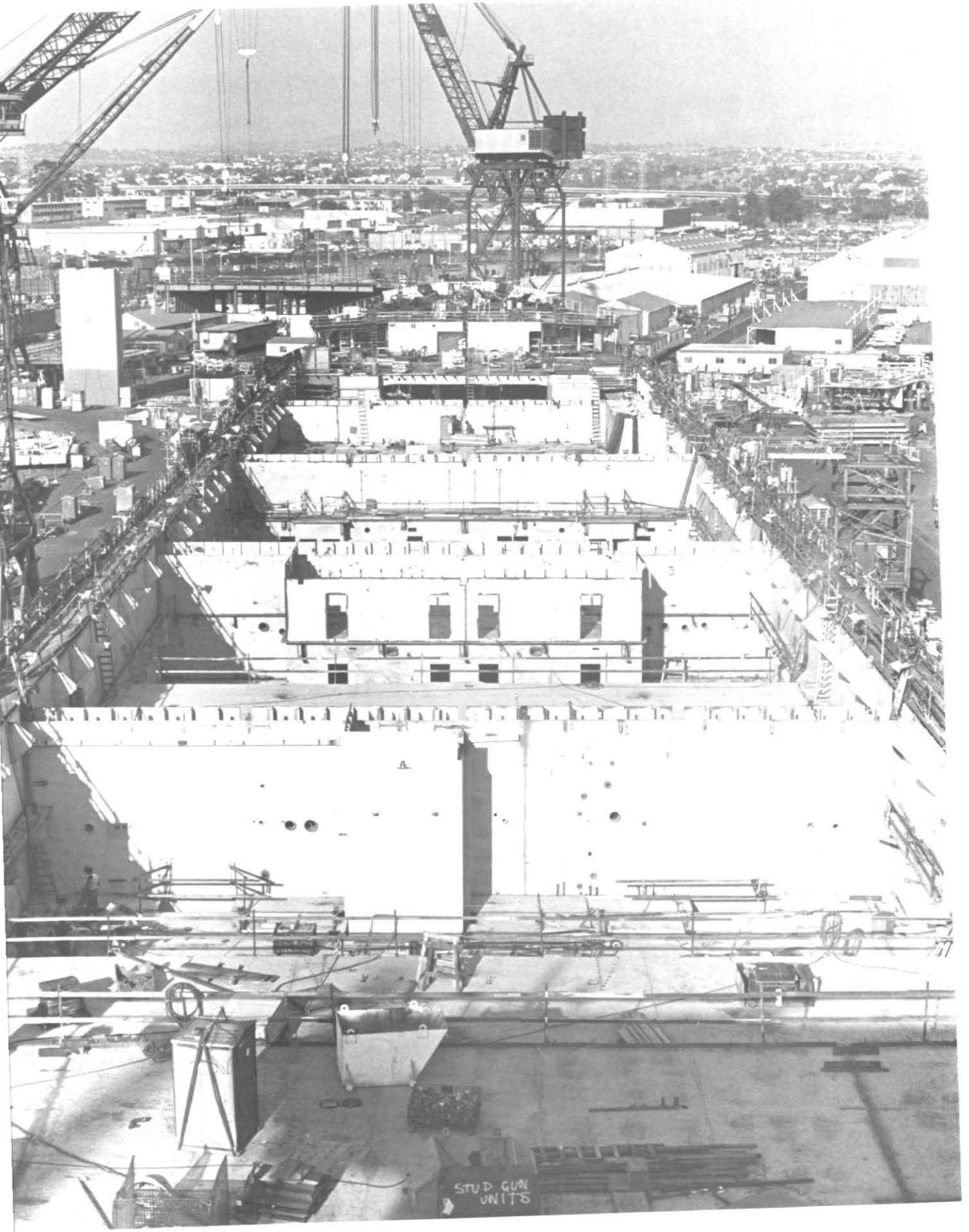


Photo by LT Doug Faulls, MSC

At first glance, *Mercy*'s new 53-ton, 26-foot diameter propeller resembles a piece of modern sculpture that might seem quite at home in a museum or city park. Sharp, curved, scimitar-like nickel-aluminum-bronze blades burnished to a dull red-brown emerge from the central hub. One's first impression is that propellers are not supposed to look like this. But hydrodynamics, not whim, dictate propeller design.

This prop is a response to a problem inherent in tanker hulls. Fully ballasted, *Mercy* will draw about 33 feet with the prop fully submerged. In such a state hydrodynamic forces on the blades fore and aft and top and bottom are equalized. As the ship is deballasted* the prop is only partially submerged, the blades are subjected to unequal pressures as some blades bite water and some air. Resulting vibration is transmitted through the shaft to the ship itself, becoming an unwelcome nuisance in an otherwise extremely stable vessel. Radically skewing the blades eliminates vibration and results in a smoother ride with little noticeable reduction in hull speed or performance.

**Mercy*'s ballast tanks alone will hold nearly 35,000 tons of seawater. To put this in perspective, the fully loaded displacement of an LHA (amphibious assault ship) is 39,300 tons.



View of Mercy *from the top of the after house. The module in the center is a crew shower and head facility.*

On 20 July 1985 *Mercy*'s graving dock was flooded and the former tanker floated free. She was towed to a nearby pier, where fitting-out operations will continue. That process is expected to take another year. *Mercy*'s contract delivery date is 8 Feb 1987.

Wasting no time, workers guided the second tanker, ST *Rose City* into the dock on the same high tide. Even though they had done it all once before, NASSCO's shipbuilders were eager to get on with the new task. The conversion contract requires the delivery of USNS *Comfort* to the Navy no later than 2 Nov 1987. In the meantime, tourists and residents will have one more hospital ship to admire. —JKH

With her new bridge in position, Mercy *is ready to be refloated for further fitting-out at another pier.*

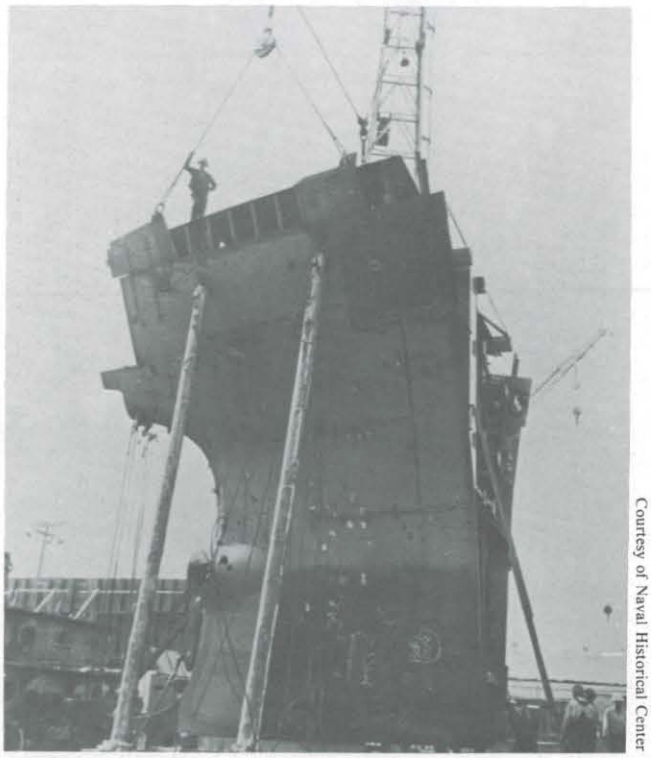
Photo by LT Doug Faulls, MSC

"Built By the Mile, Chopped Off By the Yard"

To many a recipient of their precious cargoes of tanks, planes, ammunition, and food, the Liberty ships, those "ugly ducklings" of World War II, were anything but ugly. There is little doubt that the Liberties saved Britain and the Soviet Union from certain defeat. From 1941 to 1945 over 2,700 were built in U.S. yards working around the clock. They were simple, one-design vessels, whose parts were mass produced in thousands of factories in over 32 states.

The war emergency brought new, revolutionary assembly line techniques to U.S. yards. Complete deckhouses were constructed upside-down, then inverted and lowered onto already finished decks. Everywhere were stockpiles of double-bottom sections with piping already installed, stern-frame assemblies, and even complete bow sections. Special portable welding plants welded continuously while moving at a walking pace.

By late September 1942, Liberties were being launched 10 days after keel-laying and delivered 5 days later. In November of that year *Robert E. Peary* slid down the ways 4 days, 15½ hours after its keel was laid, a record that has never been equaled.



Courtesy of Naval Historical Center

The stern section of the Liberty ship Robert E. Peary, *6 Nov 1942. Using modular construction technology, yards working around the clock produced over 2,700 of these "emergency" vessels.*

Death and Dying
Supporting Patient and Family

CDR Marion D. Hamel, NC, USN

Just in the past decade, the subject of death has left the shadow of cultural taboo and moved into the agendas of medical professionals, educators, the clergy, and the public. Death and dying has become a fit subject for public discussions. Death is still a fearful, frightening happening, and the fear of death is a universal fear even if we think we have mastered it on many levels.(*1*)

The tendency in America is to deny death, to delay or avoid thinking about it, and to paint it over with euphemisms. People in America do not die, they pass on, become deceased, go to sleep, or go to a reward. Americans regard death as a calamity. When we, our relatives, or our friends are diagnosed with a fatal illness, we tend to view it as an affront, some unnatural act or divine unfairness that, with better luck, precautions, or more competent medical care might have been prevented.(*2*) We are reluctant to abandon the concept of death as some strange and avoidable catastrophe. We search for causes instead of accepting mortality as part of the life cycle. Americans have chosen not to think about the drive toward death, even though it is as real and powerful and necessary as the drive toward life. It is nearly impossible to stand with another person in his grief unless one has faced and dealt with his own fears about his own death.

When people are forced by circumstances to reflect on what dying means, they usually discover that the definition depends on what they expect from life. Many people find it difficult, perhaps impossible, to imagine their own "nonbeing." Unconsciously, we all believe that "nonbeing" can never happen to us. Expectations shape our behavior, beliefs, and values. What we expect life to be and the meaning we attach to the ending of that life define what dying means to us.

Curing and caring are affected by human values, emotions, and thoughts. As caregivers, we are part of this death-denying society. Therefore, we must look at our own attitudes toward death and dying and realize how these attitudes can influence our care of dying patients. In order to teach death education or counsel and support terminally ill patients, their families and close friends, we must first become aware of our own mortality. We must also develop insight into our feelings, attitudes, fears, behavior, and values.

I had worked closely with terminally ill patients and their families for 4 years and had the opportunity to attend the dying and, later on, to hear stories told by the bereaved. None of these experiences were as valuable as living out my mother's last days with her. By our open sharing of emotions, reactions, and concerns, I soon realized that she was the authority on death, not I. Among many other things, she taught me that death was neither as painful nor as terrifying as I believed. She never questioned or feared death, she just didn't want to leave us.

Our success-oriented society and especially the medical community defines death as failure and discourages us from talking about it. Although talking about death is considered by many to be morbid, frankness and openness are necessary. A lot of what passes for a new awareness of mortality may really be only another effort to deny death, managing it by concepts and therapies instead of machines. It is a lack of familiarity with the subject of death and fear of the unknown that contribute in large measure to our feelings of dread and indignity when death impinges upon us. The greater the familiarity, the less our terror. The less our terror, the greater the likelihood that we can provide comfort to patients, friends, and family who face death.

The three major fears of death are fear of the unknown, fear of no longer achieving, and fear of loneliness. Death has many unknowns associated with it. There is the uncertainty of how, when, and where we will die, and of what will happen to our survivors. And what does it mean to be nonexistent?

CDR Hamel is director of Nursing Service at Naval Hospital Twentynine Palms, CA.

Ceasing to be is a difficult concept to consider and may be intensely frightening. Death is specific. We fear it and know it will happen but that doesn't mean we can accept death or overcome our fear of it. It is difficult to "give up" individuals and things in life that we enjoy and with which we identify our "selves." We are fearful of what we will miss, of not knowing how life will progress. Death evokes a feeling of ultimate powerlessness.

From early years on we develop a set of fears related to death and dying. Some fears may be considered necessary and healthy. Others can be destructive and need to be worked through. Throughout life, attitudes toward death change. As we grow older and have experienced "little deaths," our own death may become less frightening.

Many patients say they fear dying more than death itself. Dying connotes weakness, pain, dependency, loss of control, change in body image, and loss of contact with others. A number of fears are related to the process of dying as opposed to the state of being dead. The fear of a long, painful, lingering death, fear of indignities to be suffered, and the fear of being a financial and emotional burden are the major concerns of the dying.

There frequently are no definitive answers to offer dying patients about the time and manner of death, what it will be like, and why this is happening to them. Our practice of isolating those who are dying and of not speaking openly about death support the idea of death as a stigma. We often speak of the loneliness of dying patients and they are indeed lonely, for not only are they going where no one wants to follow, but also the people around them prefer to pretend the journey is not really going to happen. (*3*)

Almost all patients express the fear that they will be abandoned. Family and friends may be troubled by fears of their own death or be so shocked by the implications of a loved one's crisis that they separate themselves from them. Excuses like "I don't know what to say" or "how to act" or "I want to remember them the way they were," are used time and time again. Often isolation and/or abandonment is the first clue that death is impending. How sad it is that when patients need the closeness and companionship of relatives and friends the most, fear of death keeps them away.

Although terminal disease in a loved one is always a shock, many cannot accept the realities of the crisis or adapt to it as quickly as the patient does. The observers tend to act defensively in order to protect their own emotions and so, separate themselves from the dying individual in some way.

Abandonment is the most effective short-term defense mechanism people have; unfortunately it doesn't help the patient. Most terminally ill patients come to accept their prognosis or their fate, but acceptance does not necessarily preclude fear. For some, death is a better alternative than dying. The husband of one of my patients told me that if he knew he was going to die, he would be "madder than hell," besides being scared. He saw his wife's acceptance and told us both that he doubted if he ever would accept death. "It's just too frightening!"

In the dying process a dying person should be told the truth. One key problem is that physicians are often reluctant to do that. When relatives, friends, or health professionals presume they know what is best to tell a dying patient, they insult the patient's intelligence, character, and courage. Lies shut the door on meaningful communications that might lessen the loneliness. Only honesty can establish trust and open channels for communication. The absence of tension and game-playing may help to create the most intense and intimate form of exchange that people will have in their lifetimes. After all, the truth won't kill them, their illness will.

The majority of informed patients adapt favorably to the truth. In fact, the so-called "uninformed" usually are not only aware of the nature of their disease but often learn of it anyway from outsiders. If honesty and integrity are valued in living, should they be defiled in dying? It is obviously necessary to balance candor with kindness, but anyone who asks a direct question ought to be given a full and adequate answer. The main questions are not whether to tell a patient about his terminal illness, but who shall tell, how much to tell, how to tell, when to tell, and how often to tell. Patients deserve thorough assessments of their needs and of their abilities to cope with this knowledge.

If the American health care system is deficient, it is because it has not yet heard the words one dying patient put to her doctor. "All I want to know is that there is someone to hold my hand when I need it. Death may be routine to you, but it's new to me."(*4*) Dying people make good teachers if we allow them to talk and we listen. How frustrating it must be to receive get well cards when you know that you never will, or want to share your final feelings only to be met by a cheery voice saying, "Don't talk like that. Don't be morbid. You'll be better in no time." Once a patient is told of his diagnosis and prognosis, he must cope not only with his personal fears but with those of relatives, friends, health care professionals, and society at large. The needs and feelings of the patient determine what is necessary at any given time. The most important things to convey to the patient and his family are genuine concern and acceptance.

The goals of helping a patient cope with impending death include the enhancement of the quality of remaining life. This goal is centered on two premises: first, the desire and motivation to retain control over one's life (and death) and secondly, to live as fully as possible, without pain, with good quality in relationships, with self-awareness of the changes in mind and body, and with the ability to make choices. If we can be in tune with the messages dying people are giving us, and if we can listen to the fears and choices they are expressing, we may be able to offer them more than physical comfort.

Working with terminally ill patients

and their families for the past 12 years has taught me a great deal. But until someone you love is dying you have no reference. You are forced to rely on what you read, what you have observed, what people tell you about their concerns, and your own feelings of sympathy or empathy. The jumble of emotions, including despondency, helplessness, anxiety, resentfulness, guilt, and unreasonable anger, are present and said to be natural. So is the feeling of being overwhelmed. Your loved one and you can exchange real feelings, play act, support, encourage, or burden each other depending on your individual temperaments and awareness. Dying means loss; it is separation from a person we love, from places and objects we treasure, from a part of our self-identity. We eventually develop an understanding of dying from the ways we have learned to cope emotionally with the wounds of loss. I feel closer to terminally ill patients and their families because I can share my experiences and truly relate to them.

* * *

At the Naval Hospital Jacksonville, FL, Oncology Clinic is held 2 days a week. The patients come in early to have their blood work drawn and sometimes wait up to 3 hours to be seen and treated. Our one oncologist maintains an average patient load of 120 patients with various cancers, treatment protocols, and prognoses. We have our own waiting room and serve juice, coffee, and rolls—that may be all a patient undergoing chemotherapy that day can tolerate. The waiting time is used for what the patients call "group therapy." They talk about their cancer and their treatment and quickly absorb new patients into the oncology family. They share feelings, problems, solutions, hints, and ideas. They effectively alleviate a lot of fears and are adept at identifying what is really bothering someone. They all bring a family member with them and they too are encouraged to participate in the treatment and the group.

I am supposedly the group leader but seldom need to motivate or steer the participants. We are close friends and when we lose one of our friends the support system is there to help us cope with our loss. Because of varying schedules, the groups change from week to week but keep close track of each other. If one of the patients is hospitalized he never lacks for visitors or cards or someone to talk to. Our patients are not abandoned.

We do talk about death indirectly in the group but rather openly in private. The patient is usually the one to bring up the subject and then we discuss it. All questions are answered honestly, and we keep nothing from the patient or his family unless he requests it. Whether the doctor decides, based on clinical evidence of ineffectiveness, to stop treatment or the patient chooses not to subject himself to chemotherapy, we continue to see our patients in the same clinic so they maintain contact with us and their group of friends.

It is impossible to work closely with terminally ill patients and their families without getting involved. Fran was first seen in Internal Medicine Clinic in February 1983 with complaints of rash, intense pruritus, drenching night sweats, and a 6-pound weight loss. She was a 15-year-old dependent daughter who was painfully shy and very embarrassed about being hospitalized and examined. After a thorough workup she was diagnosed as having Hodgkin's disease. She and her mother went to Bethesda where staging was done, and they were told that Hodgkin's disease was treatable and her prognosis good.

Fran came to Oncology Clinic to start chemotherapy but wanted nothing to do with the other patients; they were old and probably going to die so she had nothing in common with them. She talked very little with us and would not even participate in casual conversation. Fran kept getting worse. The chemotherapy made her sick; she lost her hair; she developed foot drop, and treatment did not control her disease at all. Different protocols were employed. She received radiation for her ever-enlarging chest mass. Fran was in and out of the hospital, being put through what she considered torture and nothing seemed to be doing any good. She was scared, and she asked what would happen to her if nothing worked.

We saw a lot of each other and it got so that Fran would not allow any procedures or tests until she talked with me first and then insisted I be with her. I promised her I would never lie to her so she always had a lot of questions for me. But there was one question she never asked.

Her family was under tremendous pressure. She was the oldest of three children. Her sister was 12 and her brother 3. Her father, a lieutenant commander in the Navy, never was very close to Fran before her illness and grew even more distant from her and the family. Her mother was given full responsibility for Fran and was expected to do all her housewifely "duties" as well.

Fran felt responsible for all her family problems because, she said, they didn't start until she got sick. She would call me at work or at home because she needed someone to talk to. During one family crisis she begged me to come and take her out of the house for a while. Just before Easter, when she was hospitalized for another extended stay, she told me that I was her "very best friend." I felt very sad when she said that. She was 16 and should have had friends her own age. She said, "Do you know why you are my best friend? Because you are always there when I need you." She never asked me if she was going to die. She knew but didn't want to hear the answer. She asked if the hospital had a morgue, how long bodies stayed in the morgue and how cold it was? When her pet rabbit died we talked about death and heaven, but not in relation to her. She never questioned why her illness happened to her but said, "If someone in my family had to get this sick, it's a good thing it was me because I don't think anyone else could handle it." A few days later Fran had a horrible allergic reaction to one of the medications. I told her I thought she was a

very courageous girl. She said, "No, I'm not courageous—I just don't have any choice, I don't want to die." Fran did die the following Saturday. I was with her, holding her hand.

Ultimately, every death is considered a unique phenomenon, which each individual must resolve their own way. Death is both a concept and a force that will touch each of our lives and the lives of all those we cherish.(*5*)

The trauma of dying can at least be partially alleviated through open communication. Discussing our fears, aversions, and attitudes is the best hope we have for facing death more directly and with greater compassion.

References

1. Becker, Hannon, Russell: *Death and Dying*. New York, John Wiley & Sons, 1982, p 33.
2. Shepard M: *Someone You Love Is Dying*. New York, Charter Books, 1975, p 12.
3. Ibid., p 59.
4. Langone J: *Vital Signs*. Boston, Little, Brown & Co, 1974, p XV.
5. Becker, op. cit., p 56.

Bibliography

1. Becker, Hannon, Russel: *Death and Dying*. New York, John Wiley & Sons, 1982.
2. Brown NO: *Life Against Death*. New York, Vintage, 1959.
3. Davidson GW: *Living With Dying*. Minneapolis, Augsburg Publishing, 1975.
4. Kubler-Ross E: *Death, The Final Stage*. Englewood Cliff, New Jersey, Prentice-Hall, 1975.
5. Kubler-Ross E: *On Death and Dying*. New York, McMillan, 1971.
6. Langone J: *Vital Signs*. Boston, Little, Brown & Co, 1974.
7. Lifton RJ, Olson E: *Living and Dying*. New York, Bantam Books, Inc, 1974.
8. Lukeman B: *Embarkations*. Englewood Cliff, New Jersey, Prentice-Hall, 1982.
9. Moreson RS: Dying. *Sci Am*, Sept 1973, pp 55-62 & 229.
10. Shepard M: *Someone You Love Is Dying*. New York, Charter Books, 1975.
11. Woodward KL: Living with dying. *Newsweek*, May 1, 1978. □

X marks the approximate position where a German U-boat torpedoed MS Moldanger.

Norwegian Rescue

Trygve Gjestland, M.D.
Lyndon E. Lee, Jr., M.D.

It was mid-August 1942 in the North Atlantic, fine weather and almost a dead calm. With its course set for New York, the Norwegian freighter, *Washington Express* plowed westward, her crew nervously scanning the surface for telltale periscope wakes. The summer day and peaceful sea gave not a hint that the world was at war, and that the Britain to New York run was hardly safe. Even though the *Washington Express* shunned the regular sea lanes, as it neared the American coast this was scant comfort. German U-boats, operating singly and in wolf packs, lay in wait. In the past, their torpedoes had sunk many vessels within sight of American beaches.

Suddenly, one of the gunners on the bridge spotted what appeared to be a yellowish sail astern of the beam. The captain decided to investigate the suspicious object, keeping in mind the possibility that it was clever bait. The Germans were known to lure unsuspecting ships within range by tying makeshift rafts to their just submerged conning towers.

With engines all ahead full, the Norwegian freighter swung a wide arc around the mysterious craft that turned out to be two liferafts. Through binoculars, the crew could make out nine men; one had a very light full beard and appeared to be Scandanavian.

The decision was made to take the castaways aboard as quickly as possible and vacate the area. As the *Washington Express* hove to, a crewman threw a line which landed about 50 feet short. A man on one of the rafts jumped into the sea, retrieved the line, and returned to the raft. Even as he swam, crewmen lining the rail watched with dismay as a 7-foot shark lazily investigated. The ship's third officer shouted the danger over a megaphone and hefted a submachinegun just in case, but the shark swam by peacefully and soon disappeared.

The men clambered up the ladder under their own power without assistance—seven Norwegians, one Dane, and one Swede—all survivors of the Norwegian freighter, MS *Moldanger,* torpedoed 48 days before. Not much was said as they came on deck. "It was certainly a moment none of us will ever forget," recalled a crewman. "And not at the least, the men rescued were our own people, and I, least of all, would deny there was perhaps a tear in my eye when I shook their hands."

After a welcome meal of scrambled eggs, oatmeal porridge, and bread, they told their saga. The *Moldanger* had been on its way from Buenos Aires to New York when the U-boat struck about 1630 hours on 27 June 1942. The first torpedo penetrated amidships on the port side killing two crewmen as it penetrated the engine room and destroyed the refrigerating plant. Three minutes later, with water above the tops of the engines, a second torpedo

This story is based on an article that appeared in the Norwegian publication *Krigsseileren* (Merchant Seamen at War) originally entitled "The Experience of Norwegian Seamen at War: Nine Men on Two Rafts for 48 Days," No. 4-1983. We thank the coauthors Dr. Trygve Gjestland of Oslo, Norway, and Dr. Lyndon E. Lee, Jr., of the Veterans Administration, Washington, DC, for bringing the article to our attention. Our thanks also to the Naval Intelligence Support Center, Washington, DC, for translating the document.

hit astern about 5 minutes after the first on the port side directly below a lifeboat which was being lowered from the port poopdeck. Eleven men perished. Ten minutes later the *Moldanger* slid beneath the sea, leaving the 31 (out of a crew of 44) survivors 300 miles off the U.S. coast in a motorized lifeboat, a gig, and two liferafts.

Before abandoning ship, many of the men had donned rubber exposure suits, coats, and sweaters over their clothes. Seventeen crewmen, including the captain and the wounded, manned the motorboat, five were in the gig, and the remaining nine bobbed about in the two rafts.

The boats and rafts were at first tied together with the motorboat towing, but progress was too slow for the wounded, one of whom lay near death. Lines were cast off and the two boats pulled toward land separately, lightened of their burden. As soon as they reached land they would send help to those left at sea. The parting occurred 3 days after the torpedoing. On 5 July 1942 the small lifeboat landed at Cape May, NJ. Two days later and 10 days after *Moldanger*'s sinking, a Canadian warship rescued the crewmen aboard the motor lifeboat.

For those left behind, the fight for survival had just begun. The rafts, tethered together by a 60-foot towline, were of the standard American type, about 9 x 6 feet with a well in the center for storing equipment. They were designed to carry but four men each. One raft had a capacity crowd plus one. Four men could lie down at a time, usually with their knees tucked under them. The fifth had to stand and this position was assigned by turn. Each raft had wooden casks containing about 2.6 gallons of water and emergency rations for 8 days.

The food was scanty. Each raft had one round tin with screw caps at both ends. The gaskets were broken and seawater had already ruined two-thirds of the contents. Two of these coarse-flour biscuits were issued to each man for 2 days, then one per man until the supply gave out 20 days later.

Each raft also had 12 bottles containing 1,500 chocolate-covered malted milk tablets and a separate supply of 144 peppermint tablets made of dextrose. All the tablets were exhausted 3 weeks into the ordeal.

With all their consumables gone, the men turned to the most available resource—the sea. They began to fish with hooks made of safety pins from the first aid kits and tied to 2-foot lengths of string. The catch consisted of small, surface-swimming dolphin, most averaging about 8 inches in length. The men ate three to four fish per day per man at the beginning; in the last week they were limited to one fish per day per man.

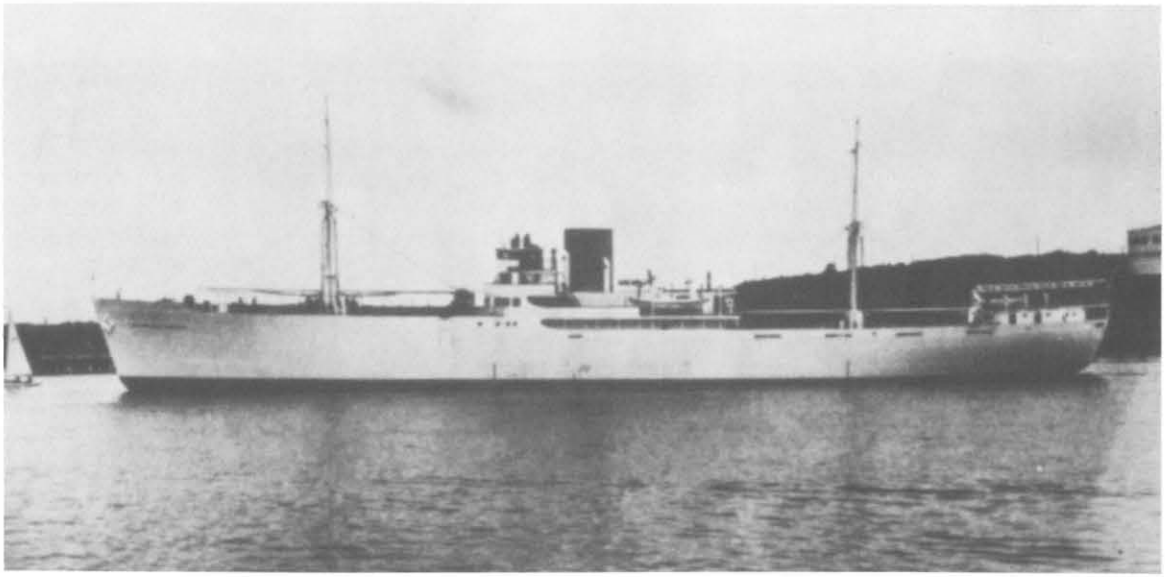
The last 2 weeks they caught three sea turtles after several unsuccessful tries. They found the best time to fish was at twilight when the unsuspecting animals swam close to the rafts. One man usually hung outside the raft and grabbed the turtles by the hind legs. Each weighed close to 60 pounds. All edible flesh was eaten. The fat in the shell was melted in the sun and tasted very good. The sailors found that fish dipped in the fat was a delicacy. They wasted nothing. They ate the heart and liver, and, the blood, which coagulated in 10 or 15 seconds, was eaten in a mass like raspberry jam. Divided among the nine men, each turtle lasted about 5 days.

Hope for rescue never died. On the 16th day they spotted a ship about 2 miles away and launched a flare which apparently went unseen. On the 30th day they saw another vessel and signaled frantically but, fearing a submarine trap, the ship sped away.

The Gulf Stream was both friend and foe. Even as the warm waters supplied the castaways with food, its eastward-moving current carried them further from the U.S. coast. Then three heavy gales lashed them. "When the first gale struck, most of us were asleep, and we were nearly swept off the rafts. We clung to everything in sight," recalled one of the Norwegians.

There were many rain showers and they were able to collect some water just as what remained in the casks ran out. To refresh their parched bodies they bathed in the sea while their comrades fended off sharks with oars. And each passing day the August Sun beat

Two days after rescue four gaunt seamen posed at the rail of Washington Express.



MS Moldanger

mercilessly upon them, sapping their strength. On the day of their rescue each man had lost a good percentage of his total body weight but, as a testament to their spirit and stamina, all climbed *Washington Express'* ladder unaided. And all would live to sail again.

Aftermath

As chance would have it, the *Washington Express* had two physicians aboard who gave the rescued sailors thorough examinations. They were Dr. Trygve Gjestland of the Norwegian Public Health Service and Dr. Lyndon E. Lee, Jr., who was returning from Britain after completing a wartime assignment for the National Academy of Sciences. The following are the partial findings of those examinations.

Einar Moldeklev, 22

General dehydration, emaciation, and slight bleeding from the gums. Moldeklev had lost 38 pounds, 23.9 percent of his normal weight of 158 pounds. During his 3-day stay on the *Washington Express* he gained 12 pounds.

Johan Moe, 20

Dehydration, emaciation. Superficial wound with encrustation over the large femoral protuberance on the right side. Defect in the extensor digitorum communis on the right side (the long extensor muscles on the underarm). Moe had lost 30 pounds or 20 percent of his normal weight of 150 pounds. He gained 18 pounds during the 3 days aboard the *Washington Express.*

Paul Andersen, 23

Dehydration, emaciation, pyorrhea. Andersen lost 48 pounds or 28.5 percent of his normal weight of 167 pounds. He gained 18 pounds during his stay aboard the *Washington Express.*

Holger Aronsson, 34

Well developed but extremely dehydrated and emaciated. When he stands he must support himself with his hands. Staggers because of exhaustion. Weakened muscle function and muscle attenuation generally. Aronsson lost 38.5 pounds, 24.3 percent of his normal weight of 158 pounds. He gained 18 pounds during his stay on the rescuing vessel.

John Bakklmyr, age unknown

Dehydration and emaciation. Hollow-eyed and sunburned but not suffering any apparent distress. Bakklmyr lost 38 pounds of his normal weight of 187 pounds, a 20.1 percent loss of body weight. He gained 10 pounds during the 3 days following rescue.

Olav Brekke, 57

Dehydration and emaciation. Brekke lost 40 pounds, 19 percent of his normal weight of 210 pounds. He gained 10 pounds during his stay aboard the *Washington Express.*

David Holgersen, 60

Dehydration and emaciation. Holgersen lost 40 pounds, 22.3 percent of normal weight of 180 pounds, but gained back 11 pounds in the 3 days following rescue.

Kaare Kaarstad, 37

Dehydration and emaciation. Lost 56 pounds or 25.9 percent of normal weight. Gained 12 pounds during his stay on the *Washington Express.*

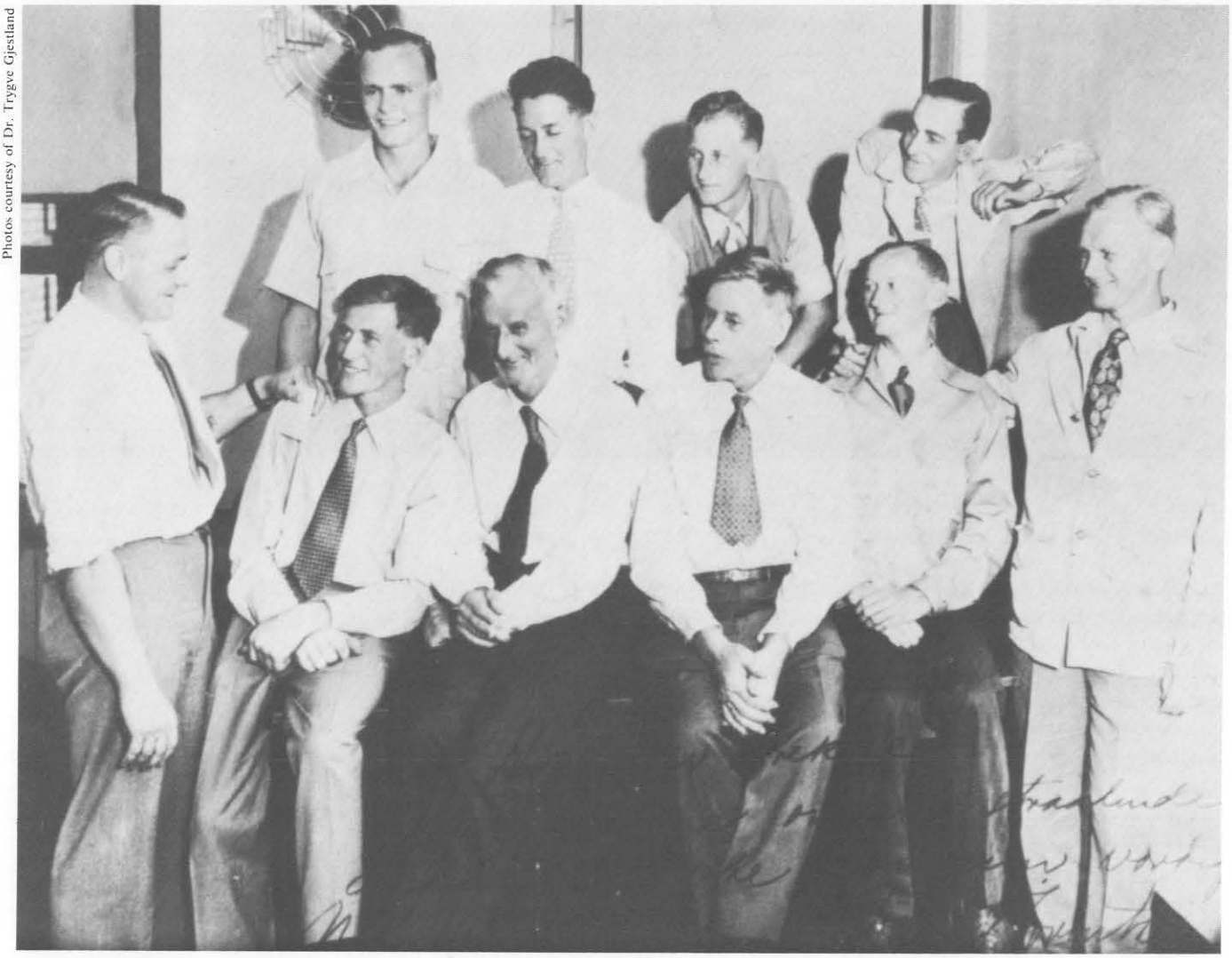
Harald Revaa, 19

Starvation with severe weakening. Lying (bed) sores in both the hip and ankle region on both sides. Revaa lost 56 pounds, 25.9 percent of his normal weight of 216. Gained 22 pounds in the 3 days following his rescue.

What was learned from the dramatic raft ordeal?

- Water was the most critical issue. The nine men had 2.6 gallons per raft.

Photos courtesy of Dr. Trygve Gjesland



This photo of the nine seamen accompanied an article about their ordeal published in the New York Times.

The Norwegian Government (in exile) increased the water supply to 6.5 gallons per raft for four men.

- A 3-square-yard piece of impregnated canvas would heretofore be provided to collect rainwater.
- Each raft would henceforth carry a red or yellow canvas tarpaulin as protection against the Sun or seas as required.
- Each raft would contain a four-compartment, watertight breadbox to store biscuits.
- The report of fishing with safety pins and string with good results demonstrated the desirability of including in each raft's equipment a fishing line complete with sinker and hooks.
- Each raft would also contain what the *Moldanger*'s rafts did not: 15 boxes of pemmican, 8 boxes of chocolate, and 5 boxes of tinned meat.
- The *Moldanger*'s rafts also lacked cutting tools of any kind. It was only fortuitous that Brekke, the carpenter, had a chisel with him. The new regulation stated that all officers and NCO's should have a knife equipped with a can opener on his person.
- Each raft would henceforth contain a single flashlight and signaling whistle.

The government committee that reported on the *Moldanger* incident also recommended that sailors finding themselves in a similar situation in the future should continue to follow the advice given in the 150-year-old *Seaman's Guide:*

"Hope, perseverance and subordination should form the seaman's great creed and duty, as they tend to banish despair, encourage confidence and secure preservation." □

Aviation Medicine in the Western Pacific

LCDR William J. Bigham, MC, USN

Practicing medicine in the operational forces can be a very rewarding experience for a Navy physician. One of several options is to become a flight surgeon and enter into the practice of aviation medicine. I would like to take this opportunity to describe for you some of my experiences.

Following a Navy internship I completed flight surgeon training at the Naval Aerospace Medical Institute (NAMI) in Pensacola, FL. The training provides the student flight surgeon with the basic knowledge and skills he or she will need in order to practice aviation medicine in the fleet. Students learn about the stresses imposed upon pilots and aircrewmen by the aviation environment such as increased G forces and decreased availability of oxygen. One also learns about life support systems currently used to protect our aircrewmen from those stresses. Student flight surgeons undergo the same survival training and swimming tests required of all student naval aviators. Instruction is provided in ophthalmology, internal medicine, ENT, and psychiatry. In addition, there is a 6-week period dedicated to basic flight training. Students are assigned to one of the training squadrons at NAS Whiting Field and can advance through the initial phase of training known as Familiarization, or FAM for short, and can even fly solo (without an instructor) if they meet the requirements. At the completion of the course, the students receive their "Wings of Gold" and are designated as Naval Flight Surgeons.

After earning my wings in May 1982 I received orders to the First Marine Aircraft Wing (1st MAW) in Iwakuni, Japan. Marine Corps Air Station (MCAS) Iwakuni is located on the inland sea of Japan approximately 20 miles from Hiroshima. It is the home of two Marine Aircraft Groups (MAG's) consisting of fighter and attack aircraft and a number of other Marine Corps organizations. It is a very active base with a large number of Marine Corps personnel and their dependents.

The 1st MAW flight surgeons' offices were in the branch clinic—a rather small but well-equipped facility with a ward to accommodate the occasional patients requiring in-house treatment. The patient population we served offered a very wide spectrum of medical pathology. The nearest naval hospital was in Yokosuka, approximately 500 miles away, so we were unable to take advantage of their services in the manner to which one can become accustomed at other air stations. We came to depend instead on the local Japanese hospital for assistance when we needed emergent backup. We had to work through interpreters and quite often we were invited to accompany the surgeons into the operating room. I came to have great respect for the high quality of medical care provided to our patients by the staff of the Japanese hospital.

For cases requiring a higher level of

Members of medical staff, Team Spirit 1983.

Dr. Bigham is currently serving as aeromedical safety officer-flight surgeon for the Commander Naval Air Force, Pacific Fleet, NAS North Island, CA. He will shortly be assigned to the Department of Ophthalmology, Naval Hospital San Diego.

care than we could provide but which were not emergent, we relied on the aeromedical evacuation (medevac) system. The U.S. Air Force had a C-9 *Nightingale* which came through twice a week to pick up patients and transport them to military hospitals elsewhere in the Western Pacific (WESTPAC) theater of operations or even back to CONUS, if necessary.

Iwakuni maintains a small town atmosphere despite its proximity to a city as large as Hiroshima and is surrounded by beautiful countryside. My wife and I lived off base and were fortunate enough to rent a nice house built in the traditional Japanese style. The change to Japanese living is quite a transition for Americans. Homes are quite small by American standards. The rooms are divided by sliding doors made of paper and wood, known as "shoji." Shoes are not worn inside homes, and floors are usually either bare wood or covered by woven mats called "tatami." Most homes have no insulation or central heating, and kerosene heaters become a part of the daily routine in the wintertime. An electric blanket was a real luxury item on the colder nights.

Transportation around Iwakuni was different too in that the traffic moves on the left-hand side of the road. Roads are very narrow, and speed limits (posted in kilometers per hour) are slower than Americans are used to. There was a lot of bicycle, moped, and motorcycle traffic, as well as heavy pedestrian traffic. Public transportation plays a most important role in Japanese life. Taxis, trains, and buses seem to be everywhere. The train system is particularly fascinating because the trains run frequently and are so punctual that you can literally set your watch by them.

One of the nicest things about being stationed in Japan was the opportunity to travel within that beautiful country. The Japanese have a very long and colorful history, and there are many beautiful old castles and shrines to see. Visits to such cities as Kyoto, Nara, and Tokyo provide the visitor with lasting memories and, of course, one has to have a firsthand view of world famous Mt. Fuji or "Fuji-San" as they say in Japan.

The Marine Corps depends on the Navy Medical Department for its medical support. When assigned to Marine units, Navy personnel can elect to wear Marine uniforms as long as they meet Marine grooming standards. Being part of a Fleet Marine Force unit is an opportunity to practice military medicine at its best. The Marines are an exceptionally good group to work with. They are very appreciative of their "Docs" and are in turn supportive in every way. Marines are very business-like when it's required but also know how to enjoy themselves thoroughly when they "take their packs off."

The author treats villagers during malaria screening visit.

The flight surgeons were assigned to a Marine fighter (F-4 *Phantom*) and various attack squadrons (A-4 *Skyhawk,* A-6 *Intruder,* and EA-6B *Prowler*) that came to Japan on deployment. We were expected to give special attention to the pilots, NFO's, aircrewmen, and other personnel of our squadrons in addition to our duties at the clinic. Squadron duties included insuring that flight personnel were physically and mentally prepared for flight duties, lecturing on various medical, safety, and survival topics, and just being available to squadron personnel when they needed someone to talk to. Flight surgeons are expected to fly in squadron aircraft so that they will be familiar with the aircraft, its mission, and the stresses that are imposed on flying personnel.

The squadrons deployed from Iwakuni to other areas in the Western Pacific. The flight surgeon also deployed with the unit along with one or two corpsmen. The squadron's health records were carried along on deployment as well as portable medi-

Having hitched a ride in a Marine OA-4M, the author participates in a bombing exercise near Okinawa.

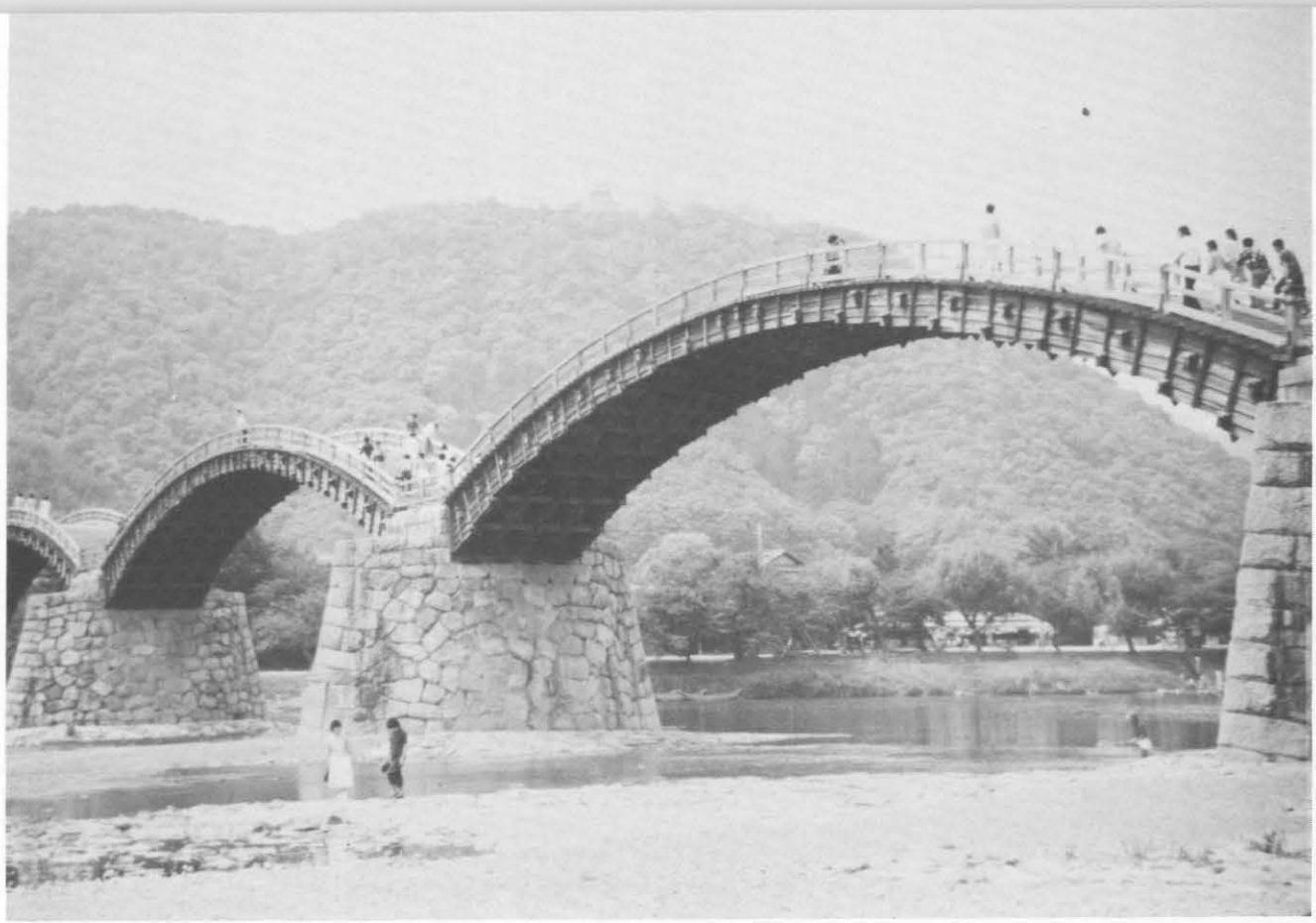
cal supply kits. Some of the common sites for deployments were Cubi Point in the Republic of the Philippines, Kadena Air Force Base in Okinawa, and one or more air stations in the Republic of Korea. We would work closely with the military medical facilities in those locations where they existed but at times had to set up our own clinics in the field.

The squadrons deploy to these other sites in order to increase their level of proficiency and combat readiness. These sites offer new bombing ranges, new terrain over which to practice certain low-level flying maneuvers and the opportunity to engage in scheduled exercises against U.S. Air Force or other units. The deployments are also an exercise in mobilizing a squadron on short notice with the goal of arriving fully prepared to carry out their mission requirements. Obviously, the ability to mobilize quickly would be a definite advantage in case of war or other national emergency and has always been one of the Marine Corps' primary objectives.

Deployments to the Philippines were educational in that a large part of daily sick call was dedicated to the treatment of dermatologic disorders and a variety of communicable diseases. Additionally, one had to expand one's list of differential diagnoses when working up a febrile illness since you could easily encounter a disease such as malaria. The terrain and wildlife in the Philippines is also out of the ordinary. The countryside is covered with dense jungle and is full of animal life, notably the monkeys which can be seen everywhere. One unforgettable sight is to view the fruit bats flying overhead just before sunset—most have a wingspan of several feet.

Cubi Point offers a survival training course known as JEST—Jungle Environmental Survival Training. During this course one learns how to find water and food and to make shelter in the jungle. You get to try out your skills by spending 2 days and 1 night in the jungle along with your guides. The only tool you have is the machete-like bolo knife, which is used to cut down small trees for use in constructing shelters and bamboo for making utensils. Dry bamboo can be used to make a fire, a jungle version of "rubbing two sticks together."

Some flight surgeons have the opportunity to visit local villages as part of the malaria screening program. When Navy teams go out to spray for mosquitoes, a medical team goes along to collect peripheral blood smears looking for evidence of malarial infestation and, at the same time, treating whatever injuries and ailments the people present with. In doing so, you feel as though you are really improving the health status of some very needy people while helping to check the spread of malaria.



Photos courtesy of the author

Kintai Bridge at Iwakuni is a popular attraction.

Viewing the way of life in the Philippines is like reading a chapter out of *National Geographic*. Most of the country is underdeveloped with much of the housing outside of towns consisting of small huts constructed of wood and bamboo. The water buffalo or carabao provides transportation as well as assistance in working the fields. The standard of living is very depressed by U.S. standards. The temperature is always warm and the weather mild except for seasonal typhoons. The land seems to be quite fertile with rice paddies and fields of sugar cane everywhere.

The Republic of Korea (ROK) is another common deployment site for Marine squadrons in WESTPAC. There are numerous bombing ranges as well as scheduled exercises for practicing air warfare. An annual exercise known as "Team Spirit" involves Army, Air Force, Navy, and Marine units operating with ROK forces. It lasts for a number of weeks in February and March. The exercise centers on our response to an invasion by North Korea. The Marine units work out of encampments established at Korean airfields. In our case, MAG-12 was assigned to K-2 airfield in Taegu for Team Spirit '83. We built a "tent city" containing all the men and materials required to support operations for the entire Marine Aircraft Group. The tents were erected on wooden platforms and heated by oil-burning heaters. The temperatures were well below freezing at night, and we had occasional light snowfalls and several rain showers.

There was ample opportunity to practice real field medicine. We treated many burns, lacerations, and fractures, and also had a high volume of patients with sinusitis, bronchitis, and gastroenteritis (most certainly not due to the food from the mess tent, which was quite good). Many of the lessons learned in ATLS, ACLS, and C-4 came in handy in this setting. We occasionally had to medevac people to the Army hospital in Seoul and were fortunate enough to have access to an Army helicopter unit at a nearby airfield.

Perhaps my most lasting impression of Korea is that the people there, at least the military forces, lived at a constantly high level of readiness to go to war. The Korean people were friendly to Americans and seemed to appreciate our presence there very much.

An operational tour is both an educational and vastly rewarding experience. It can provide a break in the grind of the postgraduate medical education process and at the same time provide an opportunity to develop skills already learned. You gain a greater knowledge of Navy and Marine Corps as they really function outside the hospital system. In becoming a flight surgeon, I achieved a longstanding personal goal. As more Navy doctors head out to the fleet, I encourage those with a sense of adventure to explore the world of aviation medicine. □

Rapid Onset Weakness in an Active Duty Submariner

LT J.A. Fornadley, MC, USN

The corpsman of a deployed nuclear submarine was called to evaluate a crewmember who awakened unable to move his legs. The patient had been in evident good health until awakening at 1100 to prepare for standing watch. While attempting to rise he discovered himself unable to move his legs against gravity. He had experienced no known trauma. There was no pain or sensory disturbance associated with his weakness. There had been no fevers, chills, night sweats, nausea, vomiting, or diarrhea. He denied headaches, diplopia, or tinnitus. There was no history of any recent illness or infection. He did not smoke. Rated as a fire control petty officer, the crewmember had performed normal workdays involving light-to-moderate physical exertion while underway for several weeks prior to the onset of symptoms. He had experienced no sleep disturbance. His most recent meal was supper the previous evening on the mess deck. No complaints had been received from other crewmembers who had eaten the same meal.

The patient recounted similar episodes in the past, the most recent occurring 15 months previously when he presented to a Navy hospital ambulating with assistance. That incident was diagnosed as weakness possibly secondary to alcohol abuse, and complete recovery occurred within 24-48 hours. There was no health record entry from this presentation. He also indicated that he had been evaluated by a civilian physician after an episode of weakness, and that the physician prescribed potassium for this condition. The patient was apparently not convinced that the potassium relieved the attacks, but nonetheless brought potassium on board ship. He had related to the corpsman his understanding that the potassium was somewhat like a "vitamin" to him. The corpsmen maintained the potassium in sickbay; none had been requested or dispensed in the months the crewmember had been on board.

The patient stated that some relatives in his mother's family had been treated for a similiar condition. He did not know if they had been told a name for the condition or if they took any medications.

Physical examination revealed a young, heavyset white man. Vital signs were normal and stable; he was not tachypneic. The patient was oriented and appropriate, with clear speech and intact reasoning. The head was atraumatic. Cranial nerves were demonstrated to be intact, except the olfactory, which was not tested. The neck was supple with no adenopathy or bruits. Examination of the chest, heart, and abdomen was normal. Acne vulgaris was noted, but there were no other skin lesions or rash. The rectal tone was intact. There was no deformity, cyanosis, or clubbing of the extremities. Upper and lower extremity range of motion and sensation was normal bilaterally. Muscular strength was graded II-III/VI in each lower extremity, the left arm, and hand. The right arm appeared normal, but the hand musculature appeared generally weak. Reflexes in all extremities were slightly decreased; plantar responses were downgoing.

Following the initial evaluation the patient was assisted out of his berth and taken to sickbay. He was able to move his legs by leaning his upper body forward and allowing gravity to swing his legs forward. An increase in muscle strength noted upon arrival at sickbay appeared related to muscular efforts by the patient on the way from his berth.

The patient requested a dose of his potassium elixir. The corpsman reviewed his medical texts to locate justification for giving this medication but was unable to find any literature on the subject. He agreed to an empiric trial of the elixir upon the patient's statement that it had been prescribed by a physician. Six grams were administered without any immediate effect upon the neurologic status of the patient. The gradual trend of improvement continued.

Two hours after onset of symptoms, the patient was able to ambulate by grasping handholds and allowing gravity to assist his legs. Within 3 hours of onset he was able to move about the ship, complaining only of residual intrinsic hand weakness bilaterally. Seven hours after the initial complaint, however, the weakness recurred. The patient required assistance cutting his food. Upon arising from supper he fell and needed help returning to his berth.

Within a few hours, he began to complain of difficulty breathing. Repeated evaluation demonstrated no tachypnea, labored respirations, or other objective evidence of respiratory insufficiency. He was able to control his secretions and could drink water without difficulty.

Further review of medical textbooks failed to provide the corpsman any information regarding possible

Dr. Fornadley is medical officer with the Commander Submarine Squadron Six.

causes of the symptoms or the use of potassium for treatment of paralysis. In light of the unexplained relapsing muscle weakness the corpsman recommended a medical evacuation. The only diagnostic possibility that appeared reasonable to the corpsman was myasthenia gravis. Despite flaws in this diagnosis it was suggested in the medevac request as a possible diagnosis so that appropriate drugs would be brought along with the medical response team. The medevac was to occur 25 hours after the initial complaint.

While preparing for the evacuation it was noted that application of tight Neil-Robertson litter fastenings caused increased subjective respiratory difficulty. The patient was closely observed and reached the submarine main deck (topside) with clear speech and no objective respiratory embarrassment.

During preparation for transfer to a small boat, he became apneic and cyanotic. Rapid transfer to the motor whale boat and initiation of Ambu bag resuscitation cleared the cyanosis. Consciousness was maintained, but spontaneous respirations did not resume. The small whale boat and medical team were hoisted directly aboard a frigate responding to the emergency.

Treatment with atropine and neostigmine for possible myasthenic crisis gave only an atropine effect on the pupils and heart rate. Despite supplemental oxygen and intubation, the patient became obtunded, and the pulse was lost. Cardiopulmonary resuscitation with cardiostimulatory drugs failed to restore the pulse and the patient expired 29 hours after onset of symptoms.

The preceding report has been the subject of a routine informal Navy investigation. The purposes of this review are to familiarize health care personnel with the rare disease process presumed to be the cause of weakness and eventual death in the case and methods to diagnose similar problems.

Medical evaluation of a patient complaint involves (a) a rapid initial assessment of health state, followed by (b) a complete evaluation of diagnostic possibilities, leading to (c) a plan for therapy.

The first assessment may be made in the initial interaction of eye contact, handshake, and exchange of pleasantries at the outset of a provider-patient encounter. Initial assessment may, on the other hand, be a formal triage of injuries in a mass casualty situation. Simply stated, patient stability must be assured before routine diagnostic evaluation and treatment proceeds.

On a deployed submarine an additional consideration must be made. The corpsman should actively consider unexplained symptoms and illnesses as the possible result of public health hazards. Table 1 lists diseases whose early presentations are consistent with findings noted in the preceding report.

Review of Table 1 shows that early signs of infectious or toxic illness can mimic the patient presentation quite closely. In the confined spaces of a submarine, a potentially epidemic problem should be considered until serial examination or other studies can eliminate this possibility. In the case presented, points of patient history suggest consideration of noninfectious causes for paralysis.

A mass lesion, such as a spinal cord tumor, represents an ominous possibility because of serious prognosis and potential for rapid deterioration. Diagnostic certainty requires laboratory and radiographic studies beyond the capability of any deployed unit. Nonetheless, several features of the presentation favor a diagnosis other than a mass lesion.

First, the patient's neurologic symptoms are quite variable and remitting, while steady progression is usually noted with a mass lesion.

Secondly, while no specific neurologic deficit is a predictable result of compression, a mass lesion large enough to cause widespread paralysis would be expected to cause some sensory abnormalities.(*1*)

While repeat examinations including funduscopic and mental status evaluations are indicated, these points suggest a diagnosis other than a mass lesion and make it prudent to consider further diagnostic possibilities.

Infectious polyneuritis (Landry Guillain-Barré syndrome) is a well described syndrome of weakness, usually beginning in the lower extremities, which progresses to involve the upper extremities and face within 1-3 days. Sensation is often unchanged. About 25 percent of cases involve the respiratory muscles sufficiently to require assisted ventilation. Respiratory compromise, if present, occurs between 2 and 21 days after onset, the average length of time being 12 days.(*2*) The facial nerve is involved alone or in combination with other cranial nerves in a large percentage of cases (85 percent in one series).(*3*)

On a submarine supportive treatment consists of observation with preparation to treat any respiratory embarrassment prior to medical evacuation. In the preceding case, the absence of cranial nerve involvement, combined with the family and personal history of paralysis makes this diagnosis less likely; further diagnostic possibilities should be considered.

The focal point of weakness is the motor unit. This has been defined as the anterior horn cell, including axon and branches, the muscle fibers innervated by the cell, and, of course, the neuromuscular junction between the two types of cells.(*4*) It would be profitable to review the disease processes affecting this unit.

Amyotrophic lateral sclerosis (ALS) ("Lou Gehrig's disease") presents as weakness without sensory loss, but this is not a serious diagnostic possibility due to the accelerated tempo of the servicemember's disease. The expected course of ALS is slow and irreversible over approximately 3 years time. Loss of muscle mass occurs with the weakness, and fasciculations are usually seen.(*5*)

Conceivably, one of the muscular dystrophies not recognizable until later life could be considered in the differential. Limb-Girdle and

myotonic muscular dystrophy have been known to appear first in the age group of the patient. Again, the tempo of disease is much too fast in the present case to suggest this as a serious diagnosis. Additionally, there is usually a discernible pattern of wasting and/or pseudohypertrophy (an increase in muscle size mimicking that seen in well developed athletes) in these cases.(*6*)

Dermatomyositis and polymyositis represent serious conditions, potentially controllable with steroid therapy. Dermatomyositis is eliminated because no rash is present. The presence of a family history of weakness symptoms makes polymyositis unlikely, as does the rapid progression of the weakness.(*7*) Also, muscle pain is frequently seen in polymyositis but was not a patient complaint.

Myasthenia gravis is a strong diagnostic possibility. This disease is sufficiently common (with prevalence of 6,000 cases in the United States) to merit consideration, with onset at any age. The weakness in myasthenia gravis is variable, and no sensory deficit is present. While virtually all cases of myasthenia gravis eventually include some combination of oropharyngeal and ocular weakness, the ocular muscles are involved initially in only about 40 percent of cases.(*8*) It should be noted, however, that the patient found that his weakness improved with exercise, while classic myasthenia shows increasing weak-

TABLE 1. Public Health Hazards Requiring Evaluation by the Independent Duty Corpsman in the Situation Presented

Disease	Etiologic Agent	Epidemiology	Diagnostic Features
1. Diphtheric polyneuritis	Diphtheria toxin	Contact between carrier and inadequately immunized host. All ages affected.	Vast majority of weakness begins with palate and blurred vision.(*17*) Extremity weakness may be the initial presentation; paralysis in CNS distribution usually occurs.
2. Tetanus	Tetanus toxin	Introduction of spores from *C. tetani* into a host via contaminated puncture wound.	Latent period usually 5-10 days (varies 3-21 days) muscle spasm (rigid paralysis) may localize to affected extremity or generalize; trismus (lockjaw) is characteristic; no relaxation between attacks.
3. Botulism	Botulism toxin	Ingestion of toxin of *C. botulinium* from inadequately prepared vegetables and meat (types A&B) or fish/marine mammals (type E) when these are served with insufficient cooking.	Symptom onset 12-48 hours after spore ingestion; difficulties with convergence progress to eye muscle paralysis, generalizing to jaw weakness, dysarthria and extremity weakness. Constipation and urinary retention may occur. Nausea, vomiting, or diarrhea may or may not precede these symptoms.
4. Typhus	*Rickettsia sp.*	Contact between a non-immunized person and infected lice, mites, ticks.	Onset 3-7 days after infection. Focal neuro signs may precede the characteristic rash and fever.
5. Meningitis	*N. mengitidis* *S. pneumonia* *H. influenza*	Spread by carrier from nasal mucosa. Complication of otitis media, mastoiditis, sinusitis.	Headache, nausea/vomiting, chills and fever; focal neuro signs are uncommon.

ness with repetitive stimulation. Despite the differences observed in the presentation, it is quite reasonable to consider a challenge with neostigmine or edrophonium. The work-up for this disease should proceed further, however, until the drugs required for the test become available. Later use of this test ruled out myasthenia gravis as a causative factor.

When the entire history and physical course is reviewed, familial periodic paralysis must be considered as the most likely disease possibility. The individual relates a family history of weakness. He has experienced one or more episodes of weakness in the past which have resolved leaving no residual trace of disease. Weakness is worse upon awakening in the morning and improves with exercise. A physician in the past has even given him potassium to take for the condition! The difficulty involved in making this diagnosis is not lack of classic symptomatology, but rather the rarity of the condition. Therefore, the following review of periodic paralysis as a disease entity is presented.

Periodic paralysis refers to a group of diseases manifesting episodic muscle weakness with recovery of strength between episodes. The diseases can result from many etiologies (Table 2). Diseases which demonstrate hereditary transmission form a subgroup referred to as "familial" periodic paralysis. Rowland and Layzer have described this group as primary periodic paralysis to distinguish these forms from episodic weakness arising secondary to a separate disorder.(*9*)

Potassium plays an important role in all varieties of episodic muscle weakness. Most authorities classify periodic paralysis according to serum potassium level during an attack of weakness. Low, high, and normal potassium levels define three distinct forms of primary periodic paralysis.

Primary hypokalemic periodic paralysis is the most common periodic paralysis in Western populations. Hereditary transmission follows an autosomal dominant pattern. Because of low penetrance of the gene in females, males account for 75 percent of cases. In the case presented, postmortem review of the family history with the parents revealed a definite hereditary pattern of weakness that appeared to be sex-linked (maternal male relatives affected). Close questioning revealed that females in this relationship were not spared but suffered generally milder symptoms. The actual inheritance pattern was clearly autosomal dominant.

Most affected individuals experience the paralysis initially in the second decade of life, although a wide variation occurs. The number of attacks may vary from one in a lifetime to daily experiences. Major weakness episodes normally begin late in a sleep period; the individual often awakens to find the attack in progress. Because of this, the usual development of weakness from the legs, proceeding to the arms and trunk, may not be apparent to the patient. Respiratory muscles can be involved during severe episodes, requiring assisted ventilation. Despite drops in serum potassium to 1 or 2 mEq/liter, cardiac dysrythmias, except for those contributed to by anoxia, are uncommon. The face and eyes tend to remain unaffected even in serious attacks, providing an important difference between this weakness and other neurologic disorders discussed above.

Episodes of weakness are more likely to occur when unaccustomed exercise or a large, high carbohydrate meal preceeds the sleep period. Emotional upset, menstruation, trauma, and infections have all been described as predisposing to an attack.(*10*)

Minor weakness episodes may occur during the day; these are precipitated by exercise (followed by rest), alcohol, or carbohydrates. Glucose and insulin have been used in a controlled clinical setting to provoke an episode of weakness for diagostic purposes. This diagnostic challenge takes advantage of the tendency of glucose and insulin to drive potassium intracellularly. Affected persons will demonstrate an exaggerated hypokalemic response with paralysis symptoms. Epinephrine and corticosteroids are also provocative.

During a weakness episode, muscular strength is decreased, with proximal muscles affected to a greater extent than distal. The sensory exam is normal and the patient remains alert throughout a usual episode. Uncomfortable cramping sensations may be present during and after the weakness. Gradual recovery may begin almost as soon as the episode is noticed, such as upon awakening to an attack. The patient can usually ambulate within a few hours, with residual defects remaining for several days.

Oral potassium, preferably potassium chloride or gluconate, is the drug of choice during an episode of hypokalemic paralysis. An initial dose of 60 mEq liquid oral potassium can be repeated hourly to a total of three doses. Tablet forms of potassium, particularly enteric-coated varieties should not be administered because of their slow absorption into the system. The benefits of potassium therapy may not be readily apparent. During a severe attack hours may elapse between treatment and observed response. Generally, the earlier treatment is initiated, the more rapidly resolution can be expected.(*11*)

Further therapeutic modalities are primarily supportive. Assistance with mild exercise such as ambulation can accelerate recovery. Frequent reevaluation of the weakness will help determine whether or not the weakness is progressing. Respiratory compromise should be treated with assisted ventilation, including intubation if necessary.

Edrophonium or neostigmine injection for the purpose of diagnosing myasthenia gravis should cause no adverse reaction in a patient with periodic paralysis. Intravenous saline solution can increase the paralysis and should be avoided, as should epinephrine in other than life-threatening situations.

The mechanism of paralysis is unknown. It appears to be a defect in the muscle itself, possibly involving the cell membrane. An abnormality in the sodium-potassium pump located in

TABLE 2. Classification of Periodic Paralysis According to Rowland and Layzer (*16*)

- Primary
  - Hypokalemic
  - Hyperkalemic
  - Normokalemic
- Secondary
  - Hypokalemic
    - Thyrotoxic
    - Potassium Losing States
      1. Urine Potassium Wasting
         - Hyperaldosteronism
         - Licorice intoxication
         - Renal disease
         - Thiazide diuretics
      2. Gastrointestinal Potassium Wasting
  - Hyperkalemic
    - Renal Failure
    - Adrenal Failure
    - Drug Induced
      1. Triampterine
      2. Spironolactone

the cell membrane has been suggested as a possible source of electrolyte imbalance resulting in the paralysis.(*12*)

A less common form of hereditary episodic muscle weakness is associated with increased serum potassium during attacks. This form, termed hyperkalemic periodic paralysis, is inherited in an autosomal dominant pattern with males and females equally affected.

In the hyperkalemic form of paralysis, the daytime (mild) attacks are more common. Nocturnal (severe) attacks cannot be clinically distinguished from those occurring in hypokalemic paralysis.(*13*)

Differentiation between the two forms of paralysis can be made on the basis of serum potassium level during the attack or by historical documentation of serum levels in previous episodes involving the individual or affected family members. Distinction is important in the treatment of this disorder, as potassium may provoke or worsen an attack of hyperkalemic paralysis. Hyperkalemic episodes may be shortened by therapeutic maneuvers which lower serum potassium. Thus, carbohydrate meals, thiazide diuretics, and infusions of bicarbonate, calcium gluconate, and insulin/glucose can aid in relieving a paralytic attack. Interestingly, while modalities that improve one form of paralysis exacerbate the other, prophylactic treatment with acetazolamide 250mg 4 times per day is effective for both varieties.(*14*)

Normokalemic periodic paralysis closely parallels hyperkalemic paralysis in terms of precipitating and ameliorating factors. It has been suggested that normokalemic paralysis be considered a simple variation of hyperkalemic paralysis.(*15*)

To summarize, episodic muscle weakness, while rare, presents a readily recognizable symptom complex. The diagnosis is made by provocative testing in a controlled situation or by serum potassium determination during a paralytic episode. Biopsy revealing vacuolation of muscle fibers will suggest the diagnosis in the asymptomatic patient.

In the absence of a family history or known causative factor, evaluation for etiology of periodic paralysis should be directed with diseases of Table 2 in mind. Supportive therapy alone (i.e., no drug therapy) should be used if the direction of potassium flux is not known.

Service members diagnosed as having periodic paralysis secondary to another disease should be removed from duty status and referred promptly to a neurology clinic. Primary (familial) periodic paralysis is incompatible with military service.

References

1. Adams RD, Martin JB: Diseases of the spinal cord, in *Harrison's Principles of Internal Medicine,* ed 10. New York, McGraw-Hill, 1983, chap 366, p 2148.
2. Merritt HH: *A Textbook of Neurology,* ed 6. Philadelphia, Lea & Febiger, 1979, p 757.
3. Ibid., p 757.
4. Rowland LP, Layzer RB: Muscular dystrophies, atrophies, and related disorders, in *Clinical Neurology.* Philadelphia, Harper & Roe, 1983, vol 3, p 1.
5. Ibid., p 10-13.
6. Merritt, op. cit., p 586-588. Rowland, op. cit., p 23-25.
7. Merritt, op. cit., p 659.
8. Ibid., p 599.
9. Rowland, op. cit., p 33.
10. Ibid., p 35.
11. Ibid., p 36.
12. Layzer RB: Periodic paralysis and the sodium-potassium pump, in *Ann Neurol* II(6): June 1982.
13. Rowland, op. cit., p 37.
14. Merritt, op. cit., p 609-610.
15. Rowland, op. cit., p 38.
16. Ibid., p 33.
17. Merritt, op. cit., p 753. □

☆ U.S. GOVERNMENT PRINTING OFFICE: 1985 - 461-650 - 128 / 20400

DEPARTMENT OF THE NAVY
Naval Publications and Forms Center
ATTN: Code 306
5801 Tabor Avenue
Philadelphia, PA 19120

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

Second-Class Mail
Postage and Fees Paid
USN
USPS 316-070

New NAVMEDCOM Commander

RADM Joseph S. Cassells, MC, USN, relieved RADM William M. McDermott, Jr., on 12 July 1985 and assumed command of the Naval Medical Command, Washington, DC.

RADM Cassells entered the Navy after graduating from medical school in 1960. He completed his residency in internal medicine and a fellowship in tropical medicine. He holds a master's degree in public health and has held several academic and research positions including head, Academic Department, Naval Medical School; chief, Experimental Parasitology Division, Naval Medical Research Institute; head, Medical Corps Programs, Naval Health Sciences Education and Training Command; deputy special assistant to the Surgeon General for Education and Training and special assistant to the Surgeon General for Professional Matters; director of Clinical Services at Naval Regional Medical Center, San Diego; commanding officer of Naval Regional Medical Center Charleston; and deputy commander for Health Care Operations, Naval Medical Command, Washington, DC. His most recent assignment was as The Medical Officer of the Marine Corps.